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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 09/503,553 | 02/11/2000 | Christophe Pierrat | 303.311US2 | 6796 |
| 21186 | 7590 | 12/19/2003 | EXAMINER | |
| SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A. P.O. BOX 2938 MINNEAPOLIS, MN 55402 | | | BROWN, KHALED | |
| | | ART UNIT | PAPER NUMBER | |
| | | 2877 | | |

DATE MAILED: 12/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) |
|------------------------------|------------------------|---------------------|
| | 09/503,553 | PIERRAT ET AL. |
| | Examiner | Art Unit |
| | Khaled Brown | 2877 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 20 November 2003.

2a) This action is **FINAL**. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 23-67 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) 47 and 48 is/are allowed.

6) Claim(s) 23-46 and 49-67 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on 11 February 2000 is/are: a) accepted or b) objected to by the Examiner.

 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) The translation of the foreign language provisional application has been received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) Notice of References Cited (PTO-892) 4) Interview Summary (PTO-413) Paper No(s). _____
2) Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) Notice of Informal Patent Application (PTO-152)
3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11-20-03 has been entered.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 23,32,34,36 and 39 are still rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1,3, (4 and 33), 1,1 respectively of U.S. Patent No. 6096457. Although the conflicting claims are

not identical, they are not patentably distinct from each other because the 6096457 patent obviously has a means for optimizing “off-axis illumination parameters” to “compensate for the effects of the phase error” and that means corresponds to “a restrictor” as claimed in the instant application.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 23-46 and 49-67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gortych et al (US 5680588) in view of Suzuki (US 5673102).
Re clms 23,27,29,32,36,39,57,61,63,64: Gortych et al discloses a system comprising; an illuminator (Gortych et al 24) and a phase shifting mask (Gortych et al 26 Col 10 line 23), an optic lens (Gortych et al col 1 line 22) and also discloses that a restrictor should be used to optimize illumination to compensate for a phase shift error in the phase shifting mask (Gortych et al, the restrictor is the “custom aperture plate” Col 9 lines 21-22, and the phase shifting mask inherently has phase shift error and that error is being compensated for by the illumination source comprising a restrictor Col 9 lines 1-4, 19-45 and col 10 lines 9-30). However, Gortych et al does not specifically state the design choice of the restrictor as claimed to restrict light from passing through a first region

having a first perimeter and to pass light through a second region between the first perimeter and a second perimeter that surrounds the first perimeter. Suzuki discloses the claimed designed choice of a restrictor to restrict light from passing through a first region having a first perimeter and to pass light through a second region between the first perimeter and a second perimeter that surrounds the first perimeter (Suzuki 18, Figs 5A and 5B) because it improves imaging of a fine pattern (Suzuki col 2 lines 12-13, 22-27). Therefore it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the design of the restrictor of Suzuki as the design of the restrictor disclosed in the apparatus of Gortych et al because it would improve imaging of the fine pattern of the phase shifting mask of Gortych et al as taught by Suzuki.

Re clm 24: the restrictor provides off-axis illumination (Suzuki Col 10 line 33-39)

Re clms 25,28: the restrictor optimizes printing of the alternating phase shift mask using empirical data taken from one or more simulations of an image on the alternating phase shifting mask (Gortych et al Col 6 lines 56-61, Col 7 lines 35-37, Col 9 lines 1-4, Col 9 lines 21-22).

Re clms 26,31,33,35,38,46,58,60,62: the phase shift mask is from the group consisting of alternating or attenuating phase shift masks (Inherently one or the other).

Re clms 30,34,37,52,59: the restrictor is a ring (Suzuki et al col 10 lines 34-35, Fig 5B) and light is not passed within the inner radius (Suzuki et al , the inner radius is along the optical axis col 10 lines 35-39)

Re clms 40-46,49-52,53-56,65-67: The above disclosed combination system is capable of performing the claimed method steps.

Allowable Subject Matter

Claims 47 and 48 are still allowed.

The following is an examiner's statement of reasons for allowance: the prior art of record fails to disclose or suggest a method of printing an image from a phase shifting mask at two different wavelengths, comprising an I-line light source and a deep UV light source all in conjunction with the rest of the claimed subject matter.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

Applicant's arguments filed 11-20-03 have been fully considered but they are not persuasive. The applicant argues that he does not know the reason why it is obvious to combine the Gortych et al and Suzuki et al references (Remarks p. 13). In addition to what is disclosed above the examiner offers the following: Gortych et al discloses that a restrictor is necessary to provide optimal illumination of a fine pattern on a phase-shifting mask but does not show a figure of that restrictor ("custom aperture plate" col 9 lines 20-23). Suzuki et al teaches that in order to provide optimal illumination of a fine

pattern, a light source having decreased intensity at a center thereof along the optical axis should be used (Suzuki et al col 2 lines 22-27, col 10 lines 32-39) and this light source is achieved through the use of a restrictor (Suzuki et al 18, Fig 5B, col 10 lines 32-39). Therefore since Gortych et al is concerned with providing optimal illumination of a fine pattern using a restrictor, it was obvious that the use of the restrictor disclosed by Suzuki et al which decreases intensity at a center along the optical axis should be used as the needed restrictor in the apparatus of Gortych et al because it provides optimal illumination. The applicant argues that he is unable to find in the Suzuki et al reference a suggestion that the restrictor 18 is used with a phase shifting mask (Remarks p. 13). However, Gortych et al is relied upon to disclose that a restrictor is used with a phase shifting mask as pointed out above. Suzuki et al is relied upon for teaching the design of a restrictor. The applicant argues that he is unable to find in the Suzuki et al reference a suggestion that a phase shifting error in a phase shifting mask is compensated. However, Suzuki discloses that a phase shifting mask inherently contains a phase shifting error (Suzuki et al col 1 line 63 - col 2 line 10) and Gortych et al discloses optimizing the illumination of a phase shifting mask (Gortych et al cols 9 and 10) and thereby compensating for any phase shifting error in the phase shifting mask. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). For any other arguments see the above rejection.

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Note: a copy of the IDS 1449 form filed 12-12-01 was mailed to applicant as an attachment to the Advisory Action mailed 10-29-03.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khaled Brown whose telephone number is 703-306-5738. The examiner can normally be reached on M-F 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on 703-308-4881. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1782.

KB
December 8, 2003

